

MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS II

MTCH 2010

Course Description:

This course represents a collection of topics, developed specifically for elementary school teachers, not covered in other courses. **3 credits**

Prerequisites:

MATH 2000 with a grade of C or better.

Overview of Content and Purpose of the Course:

This course includes geometry, measurement, number theory, algebra, and statistic topics and their conceptual development as they relate to what is taught in the elementary classroom. Topics include polyhedra, polygons, constructions, size changes, planar curves and curved surfaces, measurement, area, volume, factors, primes, equations, expressions, measures of central tendency and spread.

Anticipated Audience/Demand:

This course is designed to meet the needs of those students who will be elementary classroom teachers.

Major Topics:

1) Number Theory

- Factors and Multiples
- Even and Odds
- Divisibility Tests
- Prime Numbers
- Greatest Common Factor and Least Common Multiple

2) Algebra

- Numerical Expressions
- Expressions with Variables
- Equations
- Solving Equations
- Solving Algebra Story Problems with Strip Diagrams and with Algebra
- Sequences

3) Geometry

- Angles
- Circles and Spheres
- Triangles, Quadrilaterals, and other Polygons

4) Measurement

- Fundamentals of Measurement
- Length, Area, and Volume
- Converting between one Unit of Measurement to Another

5) Areas of Shapes

- Moving and Additivity Principles of Area
- Areas of Triangles
- Areas of Parallelograms and other Shapes

6) Solid Shapes and their Surface Area

- Polyhedra and Other Solid Shapes
- Patterns and Surface Area

7) Geometry of Motion and Change

- Reflections, Translations, and Rotations
- Symmetry

8) Statistics

- Formulating Statistical Questions, Gathering Data, and Using Samples
- The Center of Data: Mean, Median, and Mode
- Summarizing, Describing, and Comparing Data Distributions

9) Probability

- Basic Principles
- Counting the Number of Outcomes
- Probability in Multi-Stage Experiments
- Using Fraction Arithmetic to Calculate Probabilities

Methods:

This course is to be taught in a manner that has increased emphases on images, ideas, reasons, goals, and relationships. The focus is to be on the big ideas, to realize that mathematics is not about getting answers to questions, but about developing insight into relationships and structures. Students will be engaged in complex problems to develop deep understanding, instead of meaninglessly memorizing procedures for solving them.

Student Role:

Students must participate in class and complete outside projects, including activities. Students will be required to do extensive writing. To demonstrate mastery of a concept, students must be able to organize ideas and understandings. Explanations of work must be complete, conceptual, and coherent. Assignments will contain questions and activities, some completed individually, some within small groups.

Textbook: Beckmann, Sybilla. *Mathematics for Elementary Teachers*, 4th edition. Massachusetts: Pearson Education, 2012.

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